



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/775,838	02/01/2001	Toshio Hata	299002051900	1157
25226	7590	02/22/2005	EXAMINER	
MORRISON & FOERSTER LLP			LE, THAO X	
755 PAGE MILL RD			ART UNIT	
PALO ALTO, CA 94304-1018			PAPER NUMBER	
			2814	

DATE MAILED: 02/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/775,838

Applicant(s)

HATA ET AL.

Examiner

Thao X. Le

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3-11 and 15-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-11,15,17 is/are rejected.
- 7) ☒ Claim(s) 16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

### DETAILED ACTION

1. Claims 2, 12-14 are canceled.

#### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 3-11, 15 and 17 are rejected under 35 U.S.C. 103(e) over US 6541797 to Udagawa in view of US 6130446 to US 6380564 to Chen et al.

Regarding claim 1, Udagawa discloses in fig. 14 a gallium nitride (GaN) compound semiconductor light emission device (LED) comprising: a substrate 110, a n-type electrode region 101, a GaN compound semiconductor multiplayer structure

101/104/102/112, fig. 14, including active layer 102, column 22 line 61, a p-type electrode region 112, comprising a p-type transmissive electrode 123, column 24 line 25, wherein p-type transmissive electrode 123 substantially transparent, and the p-type transmissive electrode 123 transmit light which is generated in the active layer 102 and reflect from the substrate 110 so that light exits the light emission device 150.

But, Udagawa does not disclose an n-type transmissive electrode that is substantially transparent and transmits light.

However, Chen reference discloses a GaN compound LED comprises p-type transmissive electrode 210, column 4 line 7, n-type transmissive electrode 208, column 4 line 7 and fig. 2A, that are transmitting light. At the time the invention was made; it would have been obvious to one of ordinary skill in the art to use the light transmissive n-type electrode 208 teaching of Chen in Udagawa's n-type electrode region, because it would have resulted in improvement of current spreading, decrease of the operation voltage, increase of the light emitting efficiency and the uniformity of the luminous figures as taught by Chen, column 2 lines 30-39.

The recitation of 'electrodes transmit light which is generated in the active layer and reflect from the substrate so that light exits the light emission device' is only a statement of the inherent properties of the product. When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. *In re Best*, 195 USPQ 430, 433 (CCPA 1977).

Regarding claims 3-4, Udagawa discloses a GaN compound LED, wherein the n-type electrode region is located outside and is formed at least partially around a circumference of the p-type transmissive electrode, fig 13.

Regarding claims 5, Udagawa discloses the GaN compound LED includes a buffer layer 111, column 23 line 44, and an n-type GaN nitride compound semiconductor layer 101, column 22 line 56.

But Udagawa does not disclose the n-type transmissive electrode is formed on a side face of the substrate, a side face of the buffer layer, and a side face of the n-type GaN layer a region neighboring the buffer layer. At the time the invention was made; it would have been obvious to one of ordinary skill in the art to rearrange the electrode as claimed, because the rearrangement of parts was held to have been obvious. In re Japikse 86 USPQ 70 (CCPA 1950). In addition, the Applicant has no support data, which convinces that the particular claimed configuration is significant or is anything more than one of numerous configurations a person of ordinary skill in the art would find obvious for the purpose of providing n-contact contact. In re Dailey 149 USPQ 47, 50 (CCPA 1966). See also Glue Co. v. Upton 97 US 3,24 (USSC 1878). Furthermore such n-type electrode side contact and surrounded contact are already discloses by many patents such as US 6146,916 in fig. 7, US 6268618 in fig. 17-18, US 5739554 in fig. 2, US 6410944 in fig. 3, or US 6242 761 in fig. 1. This has demonstrated that such rearrangement of n-type electrode is typical in LED device to establish the contact with n-type layer.

Regarding claims 6-9, Udagawa discloses a GaN LED wherein n-type electrode region 101 further comprises a pad electrode 121, column 24 line 33, wherein the p-type electrode region 112 further comprises a p-type pad electrode 122, column 24 line 33, wherein the n-type pad electrode 121 and the p-type pad electrode 122 are provided substantially along one side of a light emitting face of the gallium nitride compound semiconductor light emission device, fig. 14, wherein the p-type pad electrode 122 is formed in the vicinity of a center of a light emitting face of the gallium nitride compound semiconductor light emission device, fig. 14.

With respect to 'n-type transmissive electrode comprises at least one of the thin metal film', see discussion in claim 1 and Chen in column 4 line 41.

Regarding to claims 10-11, Udagawa discloses a gallium nitride compound semiconductor LED wherein the n-type pad electrode is of a type which realizes an Schottky contact.

The recitation 'which realizes an Schottky contact', Udagawa discloses the structure is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. *In re Best*, 195 USPQ 430, 433 (CCPA 1977).

With respect to a gallium nitride compound semiconductor LED device wherein the n-type electrode comprises an Al or alloy, see discussion in the above claim 1 and Chen discloses the n-type electrode comprises Al or alloy, column 4 lines 40-50.

Regarding claim 15, Udagawa discloses in fig. 14 a gallium nitride (GaN) compound semiconductor light emission device (LED) comprising: a substrate 110, a n-type electrode region 101 comprising, a GaN compound semiconductor multilayer structure 101/104/102/112, fig. 14, including active layer 102, a p-type electrode region 112 comprising a p-type transmissive electrode 123, wherein p-type transmissive electrode substantially transparent, and the p-type transmissive electrode is film so as to be substantially transparent, and p-type transmissive electrode transmits light which is generated in the active layer 102 and reflect from the substrate 110 so that light exits the light emission device 150.

But, Udagawa does not disclose an n-type transmissive electrode that is substantially transparent and transmits light and the n-type transmissive electrode comprises a thick film of ITO.

However, Chen reference discloses a GaN compound LED comprises p-type transmissive electrode 210, column 4 line 7, n-type transmissive electrode 208, column 4 line7, fig. 2A, comprises a thick ITO light, column 4 line 46, that are light transmissive. At the time the invention was made; it would have been obvious to one of ordinary skill in the art to use the ITO light transmissive n-type electrode 208 teaching of Chen in Udagawa's n-type electrode region, because it would have resulted in improvement of current spreading, decrease of the operation voltage, increase of the light emitting efficiency and the uniformity of the luminous figures as taught by Chen, column 2 lines 30-39.

The recitation of 'electrodes transmit light which is generated in the active layer and reflect from the substrate so that light exits the light emission device' is only a statement of the inherent properties of the product. When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. *In re Best*, 195 USPQ 430, 433 (CCPA 1977).

Regarding claim 17, Chen do not disclose the GaN LED wherein the n-type transmissive electrode and p-type transmissive electrode of 30 nm or less.

However, Chen discloses the thickness of the transmissive electrode 208 is about 10 angstrom to several hundred angstroms (1- several hundred nm), column 4 line 27. Accordingly, it would have been obvious to one of ordinary skill in art to use the thickness teaching of Chen in the range as claimed, because it has been held that where the general conditions of the claims are discloses in the prior art, it is not inventive to discover the optimum or workable range by routine experimentation. See *In re Aller*, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955).

#### ***Allowable Subject Matter***

5. Claim 16 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art of record neither anticipated nor rendered obvious all the limitation of claim 16 including the n-type transmissive



electrode is formed completely around the circumference of the p-type transmissive electrode.

### ***Response to Arguments***

6. Applicant's arguments filed on 10 Jan. 2005 have been carefully considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

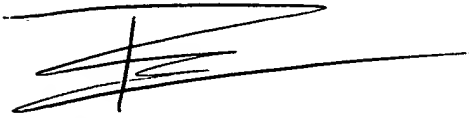
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao X. Le whose telephone number is (571) 272-1708. The examiner can normally be reached on M-F from 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M. Fahmy can be reached on (571) 272 -1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Application/Control Number: 09/775,838  
Art Unit: 2814

Page 9

A handwritten signature in black ink, consisting of several overlapping horizontal and diagonal strokes, appearing to read 'Thao X. Le'.

Thao X. Le  
Patent Examiner  
16 Feb. 2005